

**Coastal Services Center
National Ocean Service
National Oceanic and Atmospheric Administration
U.S. Department of Commerce**

STATEMENT OF WORK

BENTHIC GRAB SAMPLING AND SEDIMENT ANALYSIS

June 2005

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List of Acronyms

CO	<u>Contracting Officer</u>
COTR	<u>Contracting Officer's Technical Representative</u>
CRS	<u>Coastal Remote Sensing</u>
CSC	<u>Coastal Services Center</u>
FGDC	<u>Federal Geographic Data Committee</u>
NAD	<u>North American Datum</u>
NOAA	<u>National Oceanic and Atmospheric Administration</u>
QA	<u>Quality Assurance</u>
QC	<u>Quality Control</u>
SOW	<u>Statement of Work</u>

Notes to the reader are provided throughout this statement of work template with specific examples in *italics*.

1 Overview

This section will provide the following: 1) Information about agency requesting acquisition, 2) project or program description, 3) project goal(s), and 4) general description of requirements

The purpose of this SOW is to obtain from a contractor:

- *All equipment, supplies, and crewmembers needed to accomplish the field portion of the study;*
- *All sample and data processing needed to prepare benthic habitat maps that fully integrate the data;*
- *A detailed report that assesses the unique elements and overlaps of each data stream as compared to each other to past studies of the York River and adjacent portions of Chesapeake Bay.*

The Chesapeake Bay NERR will provide the research vessel for this study and the captain and crew needed to operate the research vessel. Sampling will occur between September 15 and December 31, 2002. The exact date will be subject to the availability of the research vessel. The contractor shall be prepared to mobilize equipment, supplies, and crew at any time during this period.

The exact sampling plan that will be used is dependent upon the technical specifications of the equipment that is used, which will not be final until a contract is in place. Therefore, only a general description of the plan can be given and upper limits set on the amount of data collected. Contractors should use limits to gage the level of effort need to fully process the samples and data stream into stand-alone products and then into integrated maps of the benthic habitats within and adjacent to the NERR.

2 Background

This section will provide a succinct description of the who, what, where, and why of the project. This should be specific information that will fully inform the reader about this effort. This section should describe the specific use of the data and/or services requested as well as the responsibilities of the contractor.

The NOAA Coastal Services Center (CSC) and the Chesapeake Bay, Virginia, National Estuarine Research Reserve (NERR) are working together to map benthic habitats within the NERR and adjacent areas of the York River, VA. This work is part of a larger effort by NOAA to develop spatial data for key elements of the research reserve system. To map benthic habitats within the Chesapeake Bay NERR, CSC and the Reserve will use a combination of techniques, including traditional benthic sampling, sediment profiling imagery (SPI), multibeam acoustics, and a high-resolution video sled. This array of sampling gears will allow the Center and the NERR to examine the synergies of sampling at multiple spatial scales and collecting data on different aspects of the benthic community in order to make recommendations to the research reserve system on optimum sampling strategies.

3 Requirements

This section will contain the specific requirements for the project. This section must be unambiguous and will be the primary information used by the contractor to prepare their technical and cost proposals.

3.1 Study Area Location and Extent

The project area must be well documented with a written description, how much area is covered by this project (e.g., sq mi, sq km, etc.), a quality map or diagram, and ESRI shapefile(s) in the appropriate projection.

3.2 Data Collection and Analysis

The section outlines specific data collection and delivery methods for benthic grab sampling and sediment analysis.

Benthic Grabs

Benthic grabs shall be collected from up to 50 stations. The contractor shall provide a standard Young grab (or similar device approved in writing by the COTR) for the benthic sampling and perform the laboratory analyses of sediment texture and benthic community analysis. Two grabs will be collected at each grab station. Samples for benthic community analyses will be processed in the field by gently washing the samples through a 0.5-mm sieve and preserving the organisms and remaining debris in buffered formaldehyde. The contractor shall provide all materials needed to process the benthic grabs in the field and for transporting the samples to the laboratory. Samples for sediment texture and organic content shall be mixed and two sub-samples (each sub-sample consisted of 100 to 200 grams of sediment) collected and stored in sealed Whirl-Pak bags and packed in ice until they can be placed in a freezer. Samples for sediment texture shall be kept frozen until ready for processing. Sediment texture shall be analyzed according to standard geological procedures.

Sediment Texture Analysis

Sediment texture shall be analyzed according to standard geological procedures. Each sample shall be washed with de-ionized water, dried, and weighed. The coarse fraction shall be separated from the fine fraction (sand/silt) by sieving through U. S. Standard Sieve Mesh No. 230 (62.5 μm). Sediment texture of the coarse fractions shall be determined at half-phi intervals by passing the sediment through nested sieves. The weight of the material collected on each sieve shall be recorded. The fine fraction shall be separated and measured either through the use of a particle size analyzer or through wet pipette analysis.

If material coarser than 2 mm is present, the Contractor shall use gravel-fraction sieves (the -5 thru -2 phi sieves) to separate. The weight of each phi class shall be recorded, and the relative percentages of the sand-fraction phi classes and gravel-fraction phi classes shall be calculated. The Contractor shall also make a visual inspection of the gravel fraction and note the relative amount of shell material in the sample as a) none or trace, b) present, or c) abundant (majority of sample consists of shell hash).

Samples for benthic community analyses shall be processed in the laboratory by emptying the entire contents of the sample containers or bags onto a 0.5-mm sieve and wash away residual formalin. Next place the animals and debris into a 1-liter bottle and stain with Rose Bengal, rewash the sample over a 0.5-mm sieve, remove all animals from debris, and place them into labeled vials. Finally by sample, identify and enumerate the animals.

Biomass shall be measured as wet weight, dry weight, and ash-free dry weight. Samples from which archive specimens are removed, which shall only be done for taxonomic purposes, shall be listed along with the specimens removed for the archive. Taxonomic groupings for biomass shall be: Porifera, Cnidaria, Polychaeta, other Annelida, Bivalvia, Gastropoda, other Mollusca, Amphipoda, Isopoda, Ostracoda, Tanaideacea, Mysidacea, Reptant Decapoda, Natant Decapoda, other Crustacea, Asteroidea, Ophiuroidea, other Echinodermata, Phoronida, Urochordata, and Miscellaneous.

Total Organic Carbon Analysis

Total organic carbon (TOC) analyses shall use a weight-loss-upon-ignition procedure. After thoroughly mixing the sample, a sub-sample shall be dried, weighed, ignited at 500 degrees Celsius to burn off organic material, and reweighed. TOC shall be reported as the weight lost upon ignition and expressed as a percentage.

If the contractor believes other delivery formats and/or mechanisms will serve the government's needs in a more efficient manner, the contractor is encouraged to propose alternatives.

3.3 Classification system

This section will detail the specific thematic classification system, if required, for a data product and should address any areas of expected confusion/special concern.

Sediment texture descriptions shall follow the Wentworth classification as described in R.L. Folk, 1974, *Petrology of Sedimentary Rocks*, Hemphill Publishing Company, Austin, Texas.

3.4 *Records and Metadata*

The contractor shall document all delivered data and data products (including options if exercised) according to Executive Order 12906 (<http://www.fgdc.gov/publications/documents/geninfo/execord.html>) Specifically, the contractor shall deliver for all data and data products, metadata records which detail all field collection methods, collection dates and times, datums, reprojections, processing steps, field records, and any other pertinent information.

The metadata records shall conform to the Content Standards for Digital Geospatial Metadata (FGDC-STD-001-1998) as published on May 1, 2000, by the Federal Geographic Data Committee (FGDC) or to any format that supersedes it as determined by the FGDC. (<http://www.fgdc.gov/metadata/csdgm/>). Profiles and extensions to the standard that have been endorsed by the FGDC shall be used if they are applicable to the data or data products. The metadata records shall contain any and all elements, including those that are considered optional, wherever applicable to the data or data product. The metadata record shall contain sufficient detail to ensure the data or data product can be fully understood for future use and for posterity. The metadata records shall be delivered free of errors in both content and format as determined by the metadata parser (mp) program developed by the United States Geological Survey or an equivalent. The metadata records will be subject to review and approval prior to final acceptance by the Government.

3.5 *Kickoff Meetings*

If a kickoff meeting is required, this can occur as a conference call to outline additional specifications and answer questions.

3.6 *Contractor Coordination*

Communication and coordination between both the contractor and the Government is considered vital to the satisfactory accomplishment of this SOW. The Contractor shall expect periodic interaction with the Government to ensure clear understanding of the anticipated products and satisfactory progress in the delivery of products.

3.7 *Deliverables*

This section contains the complete list of deliverables associated with the specific project. Each deliverable must include a proposed measure of acceptability. All submitted plans shall be of sufficient detail so that the Government can verify that the contractor has a thorough understanding of the requirements of this SOW. The contractor shall provide a percentage of the overall task order that each deliverable listed below represents in their technical proposal. Upon acceptance

of that deliverable by the government the contractor may invoice for that percentage of the overall dollar value of the task order (minus any required hold backs). The contractor may propose additional deliverables/milestones in their technical proposal if they determine they are required. The deliverables for the benthic community analysis and sediment texture analysis include:

- 1 Excel spreadsheet (or similar file approved in writing by the COTR) that lists for each station all taxa found, the number of individuals from each taxon, and either the NOAA Or contractor-developed species-identification codes;
- 2 Excel spreadsheet (or similar file approved in writing by the COTR) that lists for each station the biomass for each taxonomic group;
- 3 Final analysis report – This report shall include the required information for each sediment sample as specified by the government. The report shall be submitted electronically in Microsoft Excel format (or similar file approved in writing by the COTR);
- 4 Report that describes processing methods and results of the QA/QC checks and lists the taxonomic authorities used for identifying the organisms.

The deliverable for the sediment texture samples shall document for each sample:

1. *Folk Scale Description*
2. *Percent Gravel*
3. *Percent Sand*
4. *Percent Silt*
5. *Percent Clay*
6. *Inman's Median Phi*
7. *Folk's Mean Phi*
8. *Folk's Standard Deviation Phi*
9. *Folk's Skewness*
10. *Folk's Kurtosis*
11. *Shell Hash*

3.8 Product Delivery Schedule Guidance

If the government has any required delivery dates or time constraints they will be put in this section. Otherwise the contractor will propose the schedule. This section should also address time allocation for the re-delivery of unaccepted deliverables.

3.9 Product Delivery Addresses

The deliverables listed above shall be delivered to the following address.

1234 South Anywhere Avenue
Charleston, SC 29405
Attn:

Other Agency or agent

4 Options

This section provides a mechanism to receive price quotes from vendors from which an acceptable/fundable/affordable mix of deliverables can be selected. Cost estimates can be included here. To determine a cost estimate, both historical project information and market surveys can be used. If a cost estimate is provided, include an itemized list of the anticipated expenses. In addition, any possible vendors can be listed here as well.

5 Product Terminology/Glossary

This section is intended to ensure all unique product terms including *draft*, *revised*, and *final* are explicitly defined and understood by all parties. This list is not exhaustive and great care should be taken to include all potentially ambiguous terminology associated with the specific project.

6 References